Light-Duty Vehicle Operator Survey: Summary of July 1996 Data Collection Period

Introduction

The primary objective of the light-duty vehicle operator survey is to collect performance and driveability data on alternative fuel vehicles (AFVs) and comparable gasoline vehicles. The data are collected through telephone surveys, which are conducted by Dwights Energydata for the U.S. Department of Energy's (DOE) National Renewable Energy Laboratory (NREL). Four survey rounds are planned this year—each will be conducted during a different season to capture any seasonal differences. This report summarizes the results from the third survey, which was conducted during the summer of 1996. Dwights Energydata supplied the data to NREL, where the information was analyzed.

Data were collected on compressed natural gas (CNG) vehicles, flexible-fuel ethanol (E85) vehicles, and flexible-fuel methanol (M85) vehicles, along with gasoline control vehicles from the original equipment manufacturers (OEM). Data were also collected from gasoline vehicles that have been converted to operate on CNG (most are bi-fuel after conversion). The survey was conducted with federal government fleet managers and drivers who operate AFVs or gasoline vehicles as a regular part of their work assignments in various cities and states across the country. Most of the AFVs and gasoline vehicles are leased from the General Services Administration (GSA), except for the vehicles converted to operate on CNG. The converted vehicles evaluated in this survey were owned by the federal agency that operates the vehicles.

Fleet managers surveyed were selected randomly from a fleet contact list developed from data provided by GSA, sites involved in the DOE/NREL vehicle conversion project, and from a number of military installations. All the fleet managers in the contact list had AFVs in their fleet. Drivers surveyed were randomly selected from the contact list developed by contacting fleet managers from the GSA and CNG conversion fleet manager lists. The drivers contacted are not necessarily associated with the fleet managers who participated in the survey during this period. Although fleet managers and drivers were contacted randomly, we did focus on conducting surveys with operators located in areas of the country where alternative fuels were available. A summary of the fleet and driver survey results is provided in the sections that follow.

NREL is a national laboratory of the U.S. Department of Energy (DOE). This survey was conducted for DOE by NREL's Center for Transportation Technologies and Systems.

Fleet Manager Survey Results

The fleet manager survey was designed to obtain perspectives on AFV performance and maintenance in comparison to similar gasoline-fueled vehicles. During this survey period, fleet managers in 16 different states were contacted. Each fleet manager was asked to identify the primary alternative fuel used by AFVs in his fleet. Several fleet managers operate more than one model of AFV, or operate vehicles on more than one alternative fuel. Fleet managers contacted were categorized as follows:

Primary alternative fuel	Number of fleet managers	Fleet managers who operate more than one vehicle model on primary alternative fuel	Fleet managers who operate vehicles on other alternative fuels
CNG-OEM[1]	21	1	1 (E85)
CNG-QVM[2]	0	0	-
CNG-CON[3]	11	3	-
E85	22	3	2 (M85)
M85	21	1	2 (CNG, E85)
Total	**75**	**8**	**5**

[1] Original equipment manufacturer
[2] Qualified vehicle modifier
[3] Aftermarket conversion (See Appendix A for definitions of OEM, QVM, and conversion)

The number of vehicles in the fleets represented by these fleet managers is summarized in the following table:

Fleet size (number of vehicles)	Fleets (total LDVs)		Total AFVs in all fleets	
	No.	%	No.	%
10 or less	56	75	68	91
11 to 50	8	11	4	5
51 to 100	3	4	0	0
101 to 200	4	5	2	3
more than 200	4	5	1	1

When asked if drivers of their fleet vehicles specifically requested AFVs, fleet managers provided the following information:

Response	Fleet managers responding this way	
	No.	%
Don't want AFV	10	13
Want AFV	4	5
Neutral	61	81.3

The most common reasons drivers of their fleet vehicles didn't want or were neutral about the AFVs included: (1) lack of vehicle range (primarily dedicated CNG vehicles), (2) lack of vehicle choice, and (3) lack of convenient refueling or no alternative fuel available (common for alcohol-fueled vehicles).

Fleet managers were asked if drivers of their fleet vehicles tend to report more vehicle performance complaints about AFVs or gasoline vehicles. Sixty-four of the 75 (85%) fleet managers indicated no difference in the number of performance complaints between AFVs and gasoline vehicles. Nine (12%) fleet managers reported that the AFVs received more complaints, and the remaining two fleet managers reported gasoline-fueled vehicles received more complaints.

When asked about the specific performance complaints they had received from their AFV drivers over the last month, fleet managers reported the following:

Complaints about AFVs	Fleet managers who received complaints	
	No.	%
Hard to start	1	1.3
Stalled after starting	1	1.3
Stalled in traffic	1	1.3
Poor idle	1	1.3
Hesitation	1	1.3
Lack of power	2	2.7

Fleet managers were also asked about driver reports of engine ping and the check engine light coming on, but none reported receiving these complaints. Overall, few complaints were received from drivers operating AFVs in these fleets.

The fleet managers were next questioned about their AFV fueling practices. Thirty-one of the 75 (41%) fleet managers reported that there was *not* an alternative fuel station reasonably close to them. Fifteen of the 75 (20%) fleet managers received complaints from their drivers about alternative fuel stations being hard to find (i.e., there are not enough stations). When asked if the AFVs in their fleet were usually fueled with an alternative fuel or gasoline, the following information was obtained:

Fuel usually used in AFVs	All fleet managers responding this way		Responses of fleet managers whose primary AFV type is:							
			CNG				E85		M85	
			OEM		CON					
	No.	%	No.	%	No.	%	No.	%	No.	%
Alternative fuel	45	60	21	100	8	73	13	59	3	14
Gasoline	30	40	0	0	3	27	9	41	18	86
Total	75	100	21	100	11	100	22	100	21	100

Fleet managers reported their AFVs are being refueled about 60% of the time with an alternative fuel. Flexible-fuel vehicles designed to use M85 are the least likely to be regularly fueled with an alternative fuel.

Finally, fleet managers were asked questions related to vehicle maintenance. Most of the fleet managers (96%) indicated that different or additional scheduled maintenance was not required on the AFVs. The only feedback related to regular or scheduled maintenance was that M85 and E85 vehicles required more frequent oil changes and used a special oil. The fleet managers were also asked about the frequency and types of unscheduled maintenance. Again, the majority (97%) experienced no difference in the types or frequency of unscheduled maintenance for AFVs.

The last maintenance question addressed AFV versus gasoline vehicle downtime. Ninety-seven percent of the respondents indicated that the vehicle downtime is about the same for AFV and gasoline vehicles in their fleet (all reported an average of less than one day per month). Those who indicated that downtime differed reported that AFVs had more downtime.

Driver Survey Results

The driver surveys concentrate on the operator's subjective assessment of the performance of different AFVs compared to similar gasoline vehicles. The drivers were asked several questions to determine how much driving they do at work and whether they could identify the vehicle they operate at work as an AFV. The goal was to survey 50 drivers of each of the following types of AFVs fueled with each of the following fuels: CNG-OEM/QVM, CNG conversions, E85 flexible-fuel, and M85 flexible-fuel, as well as 50 drivers of similar gasoline vehicles.

Vehicle and Driver Information

The following table summarizes the number of drivers surveyed by vehicle type:

Vehicle type	Number of drivers surveyed	% of driver surveys
CNG-OEM CNG-QVM CNG-CON	44 6 50	17.6 2.4 20
E85	50	20
Gasoline	50	20
M85	50	20
Total	**250**	**100**

During this survey period, CNG-fueled vehicles fell into two primary categories, OEMs and CONs. The OEM vehicles were further categorized as OEM and QVM (see Appendix A for definitions). The results of the CNG vehicle driver surveys are presented as OEM, QVM, and CON throughout this section. The vehicles included in the survey, including their locations, are summarized in Appendix B.

Nearly all drivers (99%) indicated that they are assigned the vehicles they drive, and have no choice of a vehicle. The amount of time the drivers had driven their vehicles, as well as their driving characteristics are indicated below:

Time driven	Drivers	
	No.	%
6 months or less	47	19
6 months to 1 year	48	19
1 to 2 years	97	39
2 to 3 years	45	18
more than 3 years	13	5

Miles driven in typical week	Drivers	
	No.	%
less than 25	16	6.4
26 to 50	46	18.4
51 to 100	61	24.4
101 to 200	48	19.2
more than 200	79	31.6

Highway driving (%)	Drivers	
	No.	%
less than 10	71	28
11 to 25	38	15
26 to 50	27	11
51 to 75	49	20
76 to 100	65	26

Refueling Information

All drivers during this survey period indicated that they refueled their own vehicles. AFV drivers were asked what percentage of the time they used an alternative fuel in the vehicles, and their answers are summarized in the following table:

Percentage of time alternative fuel used	Drivers of vehicles fueled by:											
	Total		CNG						Ethanol		Methanol	
			OEM		QVM		CON					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0 (gasoline only)	2	1	-	-	0	0	0	0	0	0	2	4
5 to 25	24	12	-	-	0	0	6	12	7	14	11	22
26 to 50	45	22.5	-	-	2	33	10	20	14	28	19	38
51 to 75	26	13	-	-	1	17	9	18	11	22	5	10
76 to 99	18	9	-	-	1	17	8	16	8	16	1	2
100	85	42.5	44	100	2	33	17	34	10	20	12	24

The results indicate that nearly all the flexible-fuel alcohol and bi-fuel CNG vehicles are operated at least part of the time on gasoline. Drivers of M85 flexible-fuel vehicles were most likely to use gasoline (instead of M85) in their vehicles (64% of drivers used M85 less than 50% of the time). When asked whether an alternative fuel station was within a reasonable distance from where most of their driving was done, about 78% of the drivers responded "yes." Most of the drivers (95%) indicated a fueling station had to be less than a half mile away to be convenient. The following table summarizes responses from drivers of AFVs regarding some attributes of alternative fuel refueling stations:

Fueling Station Attribute	Acceptable		Marginal		Not Acceptable		Total	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Accessibility	189	96	6	3	2	1	197	100
Hours of operation	188	95.5	8	4	1	0.5	197	100
Ease of filling	191	95.5	6	3	3	1.5	200	100

The majority (98%) of drivers had no personal concerns about refueling their AFV. Those not providing a response to this question generally operated their vehicle only on gasoline or did not refuel their vehicle themselves.

Vehicle Performance Information

Drivers were asked to provide an overall evaluation of how their vehicles perform. The results are tabulated below:

Vehicle performance rating	Drivers of vehicles fueled by:													
	All		CNG						E85		Gasoline		M85	
			OEM		QVM		CON							
	No.	%	No.	%	No.	%	No.	%	No.	%	No	%	No.	%
Excellent	29	12	2	4.5	1	16.7	4	8	14	29	7	14	1	2
Very good	178	72	36	82	3	50	30	60	32	65	41	82	36	75
Average	28	11	4	9	1	16.7	12	24	2	4	2	4	7	15
Fair	7	3	2	4.5	1	16.7	1	2	1	2	0	0	2	4
Poor	5	2	0	0	0	0	3	6	0	0	0	0	2	4

Ninety-five percent of drivers rated their vehicle performance as average or better. Vehicles receiving poor performance ratings were CNG-conversions and flexible-fuel M85 vehicles. When drivers were asked how an AFV compares to similar gasoline vehicles, or vice versa, the following information was obtained:

Vehicle comparison	AFV driver (AFV compared to gasoline)		Gasoline vehicle driver (gasoline compared to AFV)	
	No.	%	No.	%
Better	16	8	3	17
About the same	136	69	14	78
Not as well	45	23	1	5

The majority (77%) of AFV drivers said their vehicles were the same or better than gasoline vehicles. Equal numbers of drivers of CNG conversions, ethanol-fueled, and methanol-fueled vehicles rated their vehicle performance worse than similar gasoline-fueled vehicles. When asked why they felt the AFVs performed worse, limited vehicle range and lack of power were the most common responses. It is important to note that a fair number of the gasoline vehicle drivers surveyed (64% or 32 of 50) did not provide an answer to this question. In general, the non-responding drivers of AFVs had only driven their vehicle on gasoline and the non-responding gasoline drivers had never driven an AFV, so these drivers felt they had no basis for comparison.

Next, drivers were asked whether they had experienced any performance-related problems with their vehicle over the last month. The "yes" responses are summarized below:

Performance problem	Number of reports from drivers of vehicles fueled by:					
	CNG			E85	Gasoline	M85
	OEM	QVM	CON			
Hard to start	-	-	3	-	-	-
Stalled in traffic	1	-	-	-	-	-
Poor idle	1	-	-	-	-	-
Hesitation	-	-	-	-	-	1
Lack of power	-	-	1	-	-	-
Check engine light on	1	-	2	-	-	-
Total	3	0	6	0	0	1

Overall, few performance problems were reported. Drivers of CNG-fueled vehicles had the most performance-related problems.

Next, drivers were asked to rate the acceleration of their vehicles. The following table summarizes the responses:

Vehicle acceleration rating	Drivers of vehicles fueled by:													
	All		CNG						E85		Gasoline		M85	
			OEM		QVM		CON							
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Excellent	3	1	0	0	0	0	0	0	2	4	0	0	1	2
Very good	83	33	15	34	3	50	4	8	29	59	25	50	7	14
Average	138	56	26	59	3	50	37	74	15	31	24	48	33	69
Fair	19	8	2	5	0	0	7	14	3	6	1	2	6	13
Poor	4	2	1	2	0	0	2	4	0	0	0	0	1	2

Most drivers (90%) rated their vehicle acceleration as average or better. Vehicles receiving poor acceleration ratings were dedicated CNG vehicles, CNG conversions, and flexible-fuel M85 vehicles.

The final performance question asked of drivers was how satisfied they were with the vehicle range on a tank of fuel. The results are tabulated below:

Vehicle range rating	Drivers of vehicles fueled by:													
	All		CNG						E85		Gasoline		M85	
			OEM		QVM		CON							
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Acceptable	207	84	29	66	3	50	34	68	49	98	50	100	42	88
Marginal	35	14	12	27	2	33	14	28	1	2	0	0	6	12
Not acceptable	6	2	3	7	1	17	2	4	0	0	0	0	0	0

In general, drivers of CNG-fueled vehicles were the least satisfied with driving range; 83% of vehicles rated with marginal or not acceptable range were CNG-fueled. All drivers of gasoline vehicles were satisfied with their driving range.

Drivers were asked what their overall satisfaction level was with the vehicle they drive at work. They were asked to think about performance, convenience, and any other factors that influenced them while driving. Their answers are summarized below:

Overall vehicle satisfaction level	Drivers of vehicles fueled by:													
	All		CNG						E85		Gasoline		M85	
			OEM		QVM		CON							
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Very satisfied	48	19.4	7	16	2	33	3	6	16	33	17	34	3	6
Leaning toward satisfied	160	65	31	70	1	17	35	70	27	55	33	66	33	69
Neutral	23	9.3	2	5	3	50	7	14	4	8	0	0	7	15
Leaning toward dissatisfied	10	4	3	7	0	0	3	6	2	4	0	0	2	4
Dissatisfied	6	2.4	1	2	0	0	2	4	0	0	0	0	3	6

The majority (~84%) of drivers were satisfied or very satisfied overall with their vehicle. All the dissatisfied drivers operated CNG-fueled or M85-fueled vehicles. The most common negative responses were associated with poor mileage or range of the CNG-OEM vehicles and not enough refueling stations for all AFVs. High fuel cost was the reason given by two of three dissatisfied M85 vehicle drivers.

After they provided their satisfaction rating, the drivers were asked what influenced them most in making this evaluation. The most common response was that their vehicle performs well. Many drivers of AFVs also indicated that their vehicles perform like gasoline vehicles.

The AFV drivers were asked if they would recommend a vehicle that operates on an alternative fuel to someone else. The results are summarized below:

Recommend AFV	Drivers of vehicles fueled by:											
	All AFVs		CNG						E85		M85	
			OEM		QVM		CON					
	No.	%	No	%	No.	%	No.	%	No.	%	No.	%
Yes	164	83	39	89	3	50	40	80	45	90	37	77
No	34	17	5	11	3	50	10	20	5	10	11	23

Eighty-three percent of the AFV drivers would recommend an AFV to other drivers. Drivers of AFVs who would not recommend them were asked to identify the single most important reason. The most common answer from drivers of CNG-fueled vehicles was lack of vehicle range. Many drivers of all types of AFVs indicated they could not recommend AFVs until more fueling stations are available.

Summary

The third quarter survey round was completed with responses from 75 fleet managers and 250 drivers of federal fleet vehicles. The major survey findings were:

From fleet managers:

- Seventy-five percent of fleet managers interviewed operate 10 or fewer AFVs in their fleets.
- Lack of range and convenient refueling facilities are the most common reasons fleet managers cite for their vehicle drivers not wanting AFVs.
- Eighty-five percent of fleet managers indicated they received the same number of performance complaints about AFVs and gasoline vehicles. No specific performance complaint occurs more frequently.
- Fleet managers indicate their AFVs refuel with alternative fuel 60% of the time.
- Nearly all fleet managers (~96%) reported no difference in types or frequency of unscheduled maintenance, with vehicle downtime averaging less than one day each month.

From drivers:

- Drivers generally have more than six months experience operating their AFV. They typically drive more than 50 miles per week, with less than 10% of their driving on the highway.

- More than 40% of AFV drivers indicated their vehicles operated 100% of the time on alternative fuel. Drivers of M85 flexible-fuel vehicles were the least likely to refuel regularly with the alternative fuel.

- More than 75% of AFV drivers indicated an alternative fuel station was within a reasonable distance. Ninety-five percent of drivers indicated ½ mile as a reasonable distance.

- Ninety-five percent of AFV and gasoline drivers rated overall vehicle performance average or better.

- Performance complaints were low overall.

- Drivers of CNG-fueled vehicles were the least satisfied with driving range. Eighty-three percent of marginal and not acceptable vehicle range ratings were received from drivers of CNG-fueled AFVs.

- More than 80% of drivers were satisfied or very satisfied with their vehicle.

- Eighty-three percent of AFV drivers would recommend AFVs to others. The most common reasons for *not* recommending AFVs were the lack of refueling stations, and lack of range for CNG-fueled vehicles.

Appendix A. AFV Options Description

There are three principal types of AFVs available: original equipment manufacturer (OEM) vehicles, qualified vehicle modifier (QVM) vehicles, and aftermarket conversions (CON). The OEM vehicles are designed and built by the OEMs (such as Chrysler, Ford, or General Motors). All of the alcohol-fueled vehicles and some CNG vehicles fall into this category. OEM AFVs are designed with the engine, suspension, and chassis upgrades to result in optimum performance and durability. These vehicles have single comprehensive warranties that cover all components, including those that are specific to alternative fuels.

The QVM vehicles are similar to the OEMs except the manufacturer has joined with a "qualified" conversion company to complete the final assembly that enables the vehicle to operate on an alternative fuel. QVMs generally have the same upgrades to the engine and chassis as the OEMs, meet the same safety and emissions standards, and offer a single comprehensive warranty. The QVMs, which are currently available in CNG and LPG models, may be dedicated or bi-fuel, depending on owner preference.

Aftermarket conversions are conversions of gasoline vehicles by an independent company after the vehicle has been purchased. The converted vehicles do not have the engine and chassis upgrades offered in the OEM and QVM vehicles. The conversion company generally provides a separate warranty from the OEM and the OEM warranty will not cover problems or damages resulting from installation or operation of the vehicle on the alternative fuel. Available aftermarket conversions enable operation on CNG or LPG, and may be bi-fuel or dedicated, depending on owner preference. CNG-fueled vehicles are identified as OEM, QVM, or CON where appropriate throughout this summary.

Appendix B. Surveyed Drivers'Vehicles and Location (July 1996 Survey Period)

Vehicle/Fuel	MODEL	Year	CITY	ST
CNG-BI	Ford F150	1996	Kennedy Space Center	FL
CNG-BI	Ford F150	1995	Ft. Hood	TX
CNG-BI	Ford F150	1995	Ft Hood	TX
CNG-BI	Ford F150	1995	Ft. Hood	TX
CNG-BI	Ford F150	1995	Ft. Hood	TX
CNG-BI	Ford F150	1996	Fort Hood	TX
CNG-CON	Caravan	1995	Camp Pendleton	CA
CNG-CON	Chevy S-10	1993	Pasadena	CA
CNG-CON	Chevy S-10	1993	Long Beach	CA
CNG-CON	Chevy S-10	1993	Long Beach	CA
CNG-CON	Chevy S-10	1993	Long Beach	CA
CNG-CON	Chevy S-10	1993	Long Beach	CA
CNG-CON	Chevy S-10	1993	Long Beach	CA
CNG-CON	Chevy S-10	1995	Edwards AFB	CA
CNG-CON	Dodge D150 1 Ton	1993	29 Palms	CA
CNG-CON	Dodge D150 1 Ton	1993	Long Beach	CA
CNG-CON	Dodge D150 1 Ton	1993	Long Beach	CA
CNG-CON	Dodge D150 1 Ton	1993	Long Beach	CA
CNG-CON	Dodge D250	1992	Long Beach	CA
CNG-CON	Dodge D250	1993	North Hills	CA
CNG-CON	Ford 1 Ton	1993	Santa Ana	CA
CNG-CON	Ford Ranger	1992	Santa Ana	CA
CNG-CON	Ford Ranger	1992	Santa Ana	CA
CNG-CON	Ford Ranger	1992	Santa Ana	CA
CNG-CON	Ford Ranger	1992	Santa Ana	CA
CNG-CON	Ram Van	1993	Camp Pendleton	CA
CNG-CON	Ram Van	1993	Camp Pendleton	CA
CNG-CON	Ram Van	1995	Camp Pendleton	CA
CNG-CON	Chevy S-10	1994	Denver	CO
CNG-CON	Dodge Dakota	1995	Estes Park	CO
CNG-CON	Dodge Dakota	1995	Estes Park	CO
CNG-CON	Ford F350	1995	Montrose	CO
CNG-CON	Chevy 3/4 Ton	1994	Robins AFB	GA
CNG-CON	Chevy S-10	1995	Robins AFB	GA
CNG-CON	Chevy S-22	1991	Robins AFB	GA
CNG-CON	Chevy Station Wagon	1990	Robins AFB	GA
CNG-CON	Ford F350	1993	Robins AFB	GA
CNG-CON	Ford Ranger	1990	Robins AFB	GA
CNG-CON	GMC Pickup	1995	Robins AFB	GA
CNG-CON	Chevy S-10	1993	Crane	IN
CNG-CON	Chevy S-10	1993	Crane	IN
CNG-CON	Caravan	1994	Bethesda	MD
CNG-CON	Ford F350	1992	Bethesda	MD
CNG-CON	Ram Van	1991	Bethesda	MD
CNG-CON	Chevy C1500	1991	Kirtland AFB	NM
CNG-CON	Chevy S-10	1993	Kirtland AFB	NM
CNG-CON	Chevy S-10	1995	Kirtland AFB	NM
CNG-CON	Chevy S-10	1995	Kirtland AFB	NM
CNG-CON	Ford Ranger	1995	Kirtland AFB	NM
CNG-CON	Chevy ½ Ton	1994	Nellis AFB	NV
CNG-CON	Chevy S-10	1995	Nellis AFB	NV
CNG-CON	Chevy S-10	1995	Nellis AFB	NV
CNG-CON	Chevy S-10	1995	Nellis AFB	NV
CNG-CON	Chevy S-10	1995	Nellis AFB	NV
CNG-CON	Chevy S-10	1995	Nellis AFB	NV
CNG-DED	Caravan	1992	Putman	CA
CNG-DED	Caravan	1994	Putman	CA
CNG-DED	Caravan	1994	Putman	CA
CNG-DED	Caravan	1994	Putman	CA
CNG-DED	Caravan	1994	Putman	CA
CNG-DED	Caravan	1994	Putman	CA
CNG-DED	Caravan	1994	Putman	CA
CNG-DED	Caravan	1994	Putman	CA
CNG-DED	Caravan	1994	Edwards AFB	CA
CNG-DED	Caravan	1994	Livermore	CA
CNG-DED	Caravan	1994	Putman	CA
Vehicle/Fuel	MODEL	Year	CITY	ST
CNG-DED	Caravan	1995	South San Francisco	CA
CNG-DED	Ram Van	1993	Putman	CA
CNG-DED	Ram Van	1993	Putman	CA
CNG-DED	Ram Van	1994	Putman	CA
CNG-DED	Ram Van	1994	Putman	CA
CNG-DED	Ram Van	1994	Port Hueneme	CA
CNG-DED	Ram Van	1994	Putman	CA
CNG-DED	Ram Van	1995	Livermore	CA
CNG-DED	Voyager	1995	Livermore	CA
CNG-DED	Caravan	1994	Tampa	FL
CNG-DED	Caravan	1994	Kennedy Space Center	FL
CNG-DED	Caravan	1994	Kennedy Space Center	FL
CNG-DED	Ram Van	1994	Titusville	FL
CNG-DED	Ram Van	1994	Titusville	FL
CNG-DED	Ram Van	1994	Kennedy Space Center	FL
CNG-DED	Ram Van	1994	Titusville	FL
CNG-DED	Ram Van	1995	Titusville	FL
CNG-DED	Ram Van	1995	Kennedy Space Center	FL
CNG-DED	Caravan	1994	Robbins AFB	GA
CNG-DED	Caravan	1994	Ellenwood	GA
CNG-DED	Caravan	1994	Atlanta	GA
CNG-DED	Caravan	1993	Argonne	IL
CNG-DED	Caravan	1994	Argonne	IL
CNG-DED	Caravan	1994	Argonne	IL
CNG-DED	Caravan	1994	Argonne	IL
CNG-DED	Caravan	1994	Argonne	IL
CNG-DED	Ram Van	1994	Argonne	IL
CNG-DED	Caravan	1994	Los Alamos	NM
CNG-DED	Ram Van	1994	Pittsburgh	PA
CNG-DED	Ram Van	1994	Ft Jackson	SC
CNG-DED	Caravan	1994	Amarillo	TX
E85	Lumina	1993	Washington	DC
E85	Lumina	1994	Washington	DC
E85	Lumina	1995	Washington	DC
E85	Taurus	1994	Des Moines	IA
E85	Taurus	1995	Ames	IA
E85	Taurus	1995	Des Moines	IA
E85	Taurus	1995	Des Moines	IA
E85	Taurus	1994	Argonne	IL
E85	Taurus	1994	Elgin	IL
E85	Taurus	1994	Chicago	IL
E85	Taurus	1994	Decatur	IL
E85	Taurus	1994	Chicago	IL
E85	Taurus	1994	Chicago	IL
E85	Taurus	1994	Argonne	IL
E85	Taurus	1994	Chicago	IL
E85	Taurus	1995	Des Plaines	IL
E85	Taurus	1995	Schiller Park	IL
E85	Taurus	1995	Chicago	IL
E85	Taurus	1995	Des Plaines	IL
E85	Taurus	1995	Mt. Prospect	IL
E85	Taurus	1995	Springfield	IL
E85	Taurus	1995	Scott AFB	IL
E85	Taurus	1995	Springfield	IL
E85	Taurus	1995	Des Plaines	IL
E85	Taurus	1996	Chicago	IL
E85	Taurus	1996	North Riverside	IL
E85	Taurus	1996	Chicago	IL
E85	Taurus	1996	North Riverside	IL
E85	Taurus	1996	Bloomington	IL
E85	Taurus	1996	North Riverside	IL
E85	Taurus	1996	Decatur	IL
E85	Taurus	1996	Chicago	IL
E85	Taurus	1995	Indianapolis	IN

E85	Taurus	1996	Indianapolis	IN
E85	Taurus	1995	Southgate	MI
E85	Taurus	1994	St. Louis	MO
E85	Taurus	1995	St. Louis	MO
E85	Taurus	1995	St. Louis	MO
E85	Taurus	1995	St. Louis	MO
E85	Taurus	1995	St Louis	MO
E85	Taurus	1995	St Louis	MO
E85	Taurus	1995	St. Louis	MO
E85	Taurus	1995	St. Louis	MO
E85	Taurus	1995	St. Louis	MO
E85	Taurus	1995	St Louis	MO
E85	Taurus	1995	St Louis	MO
E85	Taurus	1995	St Louis	MO
E85	Taurus	1996	St Louis	MO
E85	Taurus	1996	St. Louis	MO
E85	Taurus	1996	St. Louis	MO
GASOLINE	Ram Van	1992	Ft Defiance	AZ
GASOLINE	Caravan	1994	Putman	CA
GASOLINE	Caravan	1994	Putman	CA
GASOLINE	Caravan	1994	Putman	CA
GASOLINE	Ram Van	1993	Putman	CA
GASOLINE	Ram Van	1993	Putman	CA
GASOLINE	Ram Van	1994	Putman	CA
GASOLINE	Ram Van	1994	Putman	CA
GASOLINE	Ram Van	1994	Putman	CA
GASOLINE	Ram Van	1994	Putman	CA
GASOLINE	Ram Van	1994	Putman	CA
GASOLINE	Ram Van	1994	Putman	CA
GASOLINE	Ram Van	1994	Putman	CA
GASOLINE	Ram Van	1994	Putman	CA
GASOLINE	Ram Van	1994	Putman	CA
GASOLINE	Ram Van	1995	Putman	CA
GASOLINE	Lumina	1995	Chicago	IL
GASOLINE	Taurus	1995	Chicago	IL
GASOLINE	Taurus	1995	Chicago	IL
GASOLINE	Taurus	1995	Chicago	IL
GASOLINE	Taurus	1995	Chicago	IL
GASOLINE	Taurus	1995	Chicago	IL
GASOLINE	Taurus	1995	Chicago	IL
GASOLINE	Taurus	1996	Chicago	IL
GASOLINE	Taurus	1996	Chicago	IL
GASOLINE	Taurus	1996	Chicago	IL
GASOLINE	Taurus	1996	Topeka	KS
GASOLINE	Spirit	1993	Wye Mills	MD
GASOLINE	Corsica	1995	Kansas City	MO
GASOLINE	Crown Victoria	1995	St. Louis	MO
GASOLINE	Econoline	1995	Kansas City	MO
GASOLINE	Lumina	1993	Kansas City	MO
GASOLINE	Taurus	1995	Kansas City	MO
GASOLINE	Taurus	1996	Kansas City	MO
GASOLINE	Taurus	1996	Kansas City	MO
GASOLINE	Taurus	1996	Kansas City	MO
GASOLINE	Taurus	1996	Kansas City	MO
GASOLINE	Caravan	1995	Billings	MT
GASOLINE	Corsica	1995	Helena	MT
GASOLINE	Econoline	1995	Miles City	MT
GASOLINE	Ram Pickup	1991	Helena	MT
GASOLINE	Ram Pickup	1991	Helena	MT
GASOLINE	Ram Pickup	1996	Billings	MT
GASOLINE	Taurus	1995	Billings	MT
GASOLINE	Ford Pickup F150	1995	Zuni	NM
GASOLINE	Caravan	1994	Ft. Douglas	UT
GASOLINE	Caravan	1994	Salt Lake City	UT
GASOLINE	Econoline	1996	Park City	UT
GASOLINE	Chevy Pickup C2500	1989	Sheridan	WY
M85	Spirit	1993	Gardena	CA
M85	Spirit	1993	Fresno	CA
M85	Spirit	1993	El Segundo	CA
M85	Spirit	1993	El Segundo	CA
M85	Spirit	1993	Alameda	CA
M85	Spirit	1993	El Segundo	CA
M85	Spirit	1993	Sacramento	CA
M85	Spirit	1993	Sacramento	CA
M85	Spirit	1993	Sacramento	CA
M85	Spirit	1993	Sacramento	CA
M85	Spirit	1993	Oakland	CA
M85	Spirit	1993	Oakland	CA
M85	Spirit	1993	Oakland	CA
M85	Spirit	1993	Canoga Park	CA
M85	Econoline	1993	Denver	CO
M85	Econoline	1993	Denver	CO
M85	Spirit	1993	Golden	CO
M85	Spirit	1993	Aurora	CO
M85	Spirit	1993	Lakewood	CO
M85	Spirit	1993	Lakewood	CO
M85	Spirit	1993	Denver	CO
M85	Spirit	1993	Denver	CO
M85	Spirit	1993	Denver	CO
M85	Spirit	1993	Denver	CO
M85	Spirit	1993	Denver	CO
M85	Spirit	1993	Denver	CO
M85	Spirit	1993	Lakewood	CO
M85	Spirit	1993	Denver	CO
M85	Spirit	1993	Aurora	CO
M85	Taurus	1993	Aurora	CO
M85	Taurus	1994	Denver	CO
M85	Spirit	1993	Washington	DC
M85	Spirit	1993	Washington	DC
M85	Taurus	1993	Washington	DC
M85	Spirit	1993	Atlanta	GA
M85	Intrepid	1995	Chicago	IL
M85	Lumina	1993	Argonne	IL
M85	Spirit	1993	Argonne	IL
M85	Spirit	1993	Argonne	IL
M85	Spirit	1993	Argonne	IL
M85	Spirit	1993	Argonne	IL
M85	Spirit	1993	Laurel	MD
M85	Spirit	1993	Landover	MD
M85	Spirit	1993	Landover	MD
M85	Spirit	1993	Towson	MD
M85	Spirit	1993	Baltimore	MD
M85	Spirit	1993	Baltimore	MD
M85	Spirit	1993	Troy	MI
M85	Taurus	1993	Dearborn	MI
M85	Spirit	1993	St. Louis	MO